ABSTRACT

An apparatus for producing the sequence of terahertz electromagnetic pulses by driven particle beam is disclosed. Initial electromagnetic beam (em-beam) is being sent to metal-dielectric structure the way that the field of said em-beam partially transforms into delayed electromagnetic wave, in preferred embodiment into the surface evanescent mode, and the beam of charged particles (cp-beam), in preferred embodiment electrons, is also being sent to said structure the way that the particles' kinetic energy partially transforms into energy of the delayed electromagnetic wave having the same phasefrequency's characteristics as transformed field of em-beam; at that, transformation of em-beam and excitation of wave by particles' cp-beam commonly take place at the same small space region, which is localized by said metal-dielectric structure. Delayed electromagnetic wave, which is generated by particle beam, is summarized with the field of em-beam, which is transformed on said structure, so, the particle beam influents on intensity of em-beam has observed after passing the region of localized transformation. The controlled changing of parameters of particle beam in interaction region leads to adequate changing of intensity of the em-beam passed through said region and this way the predetermined forming of electromagnetic pulses is realized. Alternatively, sequence of electromagnetic pulses is produced without initial electromagnetic beam directed to metal-dielectric structure, but due to presence of driven particle beam only.